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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/998,489	11/30/2001	Matt Hayek	CS11336	6375

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MOTOROLA INC.  
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EXAMINER

PEREZ GUTIERREZ, RAFAEL

ART UNIT	PAPER NUMBER
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DATE MAILED: 03/13/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/998,489

Applicant(s)

Hayek et al.

Examiner

Rafael Perez-Gutierrez

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on Nov 30, 2001
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above, claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-10 is/are allowed.
- 6) ☒ Claim(s) 11 and 13-23 is/are rejected.
- 7) ☒ Claim(s) 12 is/are objected to.
- 8) ☐ Claims \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on Nov 30, 2001 is/are a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some\* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \*See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s). 2 6) ☐ Other:

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## DETAILED ACTION

### *Information Disclosure Statement*

1. The information disclosure statement submitted on November 30, 2001 have been considered by the Examiner and made of record in the application file.

### *Specification*

2. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed. The following title is suggested: --  
**METHODS FOR PROCESSING AN RF SIGNAL IN VERY LOW INTERMEDIATE  
FREQUENCY AND DIRECT CONVERSION RECEIVERS--.**

### *Claim Objections*

3. **Claims 1-23** are objected to because of the following informalities:
  - a) On **line 8** of **claim 1**, insert --and-- after “frequency,”;
  - b) On **line 1** of **claims 2-4**, insert --further comprising-- after “Claim 1,”;
  - c) On **line 2** of **claim 2**, replace “chopping” with --and chopping the-- before “receive”;
  - d) On **line 5** of **claims 4 and 8**, insert --and-- after “threshold,”;
  - e) On **line 4** of **claim 5**, insert --and-- after “/NL),” (after the end of the equation);

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- f) On **line 1** of **claims 6-8**, insert --further comprising-- after “Claim 5,”;
- g) On **line 1** of **claims 9 and 10**, insert --further comprising-- after “Claim 8,”;
- h) On **line 2** of **claim 9**, insert --and-- after “mixing,”;
- i) On **line 3** of **claim 11** and on **line 2** of **claim 15**, insert --and-- after “signal,”;
- j) On **line 1** of **claims 12, 15, and 18**, insert --further comprising-- after “Claim 11,”;
- k) On **line 7** of **claim 12**, insert --and-- after “ratio,”;
- l) On **line 1** of **claims 13 and 14**, insert --where when-- after “Claim 11,”;
- m) On **line 7** of **claim 12**, insert --and-- after “ratio,”;
- n) On **line 1** of **claims 16 and 17**, insert --further comprising-- after “Claim 15,”;
- o) On **line 2** of **claim 17**, insert --and-- after “thereof,”;
- p) On **line 3** of **claim 17**, replace “receive” with --received-- at the end of the line;
- q) On **line 5** of **claim 19**, insert --and-- after “filter,”;
- r) On **line 6** of **claim 19**, replace “the same” with --a-- after “mixing,”;
- s) On **line 1** of **claims 20 and 21**, insert --further comprising-- after “Claim 19,”;
- t) On **line 3** of **claim 21**, insert --and-- after “threshold,”;
- u) On **line 5** of **claim 22**, insert --and-- after “frequency,”; and
- v) On **line 1** of **claim 23**, insert --further comprising-- after “Claim 22,”.

Appropriate correction is required.

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***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office Action:

A person shall be entitled to a patent unless -- (e) the invention was described in--

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

**Claim 11** is rejected under 35 U.S.C. 102(e) as being anticipated by **Atkinson (U.S.**

**Patent Application Publication # 2001/0039182 A1).**

Consider **claim 11**, Atkinson clearly shows and discloses a method in intermediate frequency and direct conversion receivers, comprising:

receiving a signal (figure 2 and page 2 paragraph 0017);

providing a local oscillator signal 24 (mixer injection frequency) (figure 2) by dividing a voltage controlled oscillator (VCO) 38 output by a frequency divide ratio (figure 2 and page 2 paragraphs 0018 and 0019),

the VCO 38 having a frequency  $F_3$  outside a bandwidth of received signal harmonics (figure 2 and page 2 paragraph 0020).

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***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office Action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the Examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the Examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

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6. **Claims 13, 14, and 18** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Atkinson (U.S. Patent Application Publication # 2001/0039182 A1)**.

Consider **claim 13, 14, and 18**, and as **applied to claim 11 above**, Atkinson further disclose that the frequency divide ratio can be selected such that the received signal is mixed at a local oscillator frequency outside a bandwidth of a fundamental frequency of the received signal (e.g., outside a channel bandwidth) or a local oscillator frequency derived from a VCO frequency that is outside a bandwidth of the nth harmonic of the received signal (page 2 paragraphs 0019 and 0020).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the teachings of Atkinson to specifically select a frequency divide ratio greater or equal to one that would have maintained the local oscillator frequency outside the bandwidth of harmonics or fundamental frequency of the received signal in order to prevent leakage of the local oscillator frequency.

7. **Claims 15-17** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Atkinson (U.S. Patent Application Publication # 2001/0039182 A1)** in view of **Freed (U.S. Patent # 6,487,419)**.

Consider **claims 15-17**, and as **applied to claim 11 above**, Atkinson clearly discloses the claimed invention except the steps of determining the signal strength and bit error rate (BER) of the received signal and increasing a gain of the received signal before mixing if the gain of the

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received signal is below a gain threshold.

Freed clearly discloses the steps of determining the signal strength of a received signal at a wireless device and increasing a gain of the received signal before mixing if the gain of the received signal is below a gain threshold (abstract and column 2 line 20 - column 3 line 26).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teachings of Atkinson with the teachings of Freed to determine the signal strength of the received signal and allow the control of the gain of the received signal if the gain of the received signal is below a gain threshold in order to efficiently manage the power consumption of the wireless device.

8. **Claim 19** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Arpaia et al.** (U.S. Patent # 6,192,225 B1).

Consider **claim 19**, Arpaia et al. clearly show and disclose a method in an RF receiver, comprising:

receiving a signal within a passband of a preselector filter 1 of the receiver (figure 2, column 3 lines 20-25 and column 4 lines 1-6);

mixing the received signal at a local oscillator (mixer injection) frequency  $f_0$  outside the passband of the preselector filter 1 (figure 2, column 4 lines 47-50, and column 4 line 58 - column 5 line 3);

chopping the received signal after mixing at a chopper frequency, the chopper frequency

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proportional to the local oscillator (mixer injection) frequency  $f_0$  (figure 2 and column 4 line 1 - column 5 line 16).

Although Arpaia et al. do not disclose chopping the signal before mixing, Arpaia et al. also disclose that the received signal is not affected by phase change element 5 and inverters 9, 9' 9 (choppers), therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the teachings of Arpaia et al. to also chop the received signal before mixing in order to improved the elimination of second-order products of the received signal.

9. **Claims 20 and 21** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Arpaia et al. (U.S. Patent # 6,192,225 B1)** in view of **Freed (U.S. Patent # 6,487,419)**.

Consider **claims 20 and 21**, and **as applied to claim 19 above**, Arpaia et al. clearly discloses the claimed invention except the steps of increasing a gain of the received signal before mixing if the gain of the received signal is below a gain threshold, mixing the received signal at a local oscillator frequency outside the passband of the preselector filter when the gain is above a threshold and within the passband when the gain is below a threshold.

Freed clearly discloses the steps of determining the gain of a received signal at a wireless device, increasing a gain of the received signal before mixing if the gain of the received signal is below a gain threshold, and mixing the received signal at a local oscillator frequency outside the passband of the preselector filter when the gain is above a threshold and within the passband

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when the gain is below a threshold (abstract and column 2 line 20 - column 3 line 26).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teachings of Atkinson with the teachings of Freed to determined the gain of the received signal and allow the control of the gain of the received signal if the gain of the received signal is below a gain threshold in order to efficiently manage the power consumption of the wireless device.

10. **Claims 22 and 23** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Arpaia et al. (U.S. Patent # 6,192,225 B1)** in view of **Atkinson (U.S. Patent Application Publication # 2001/0039182 A1)**.

Consider **claims 22 and 23**, and **as applied to claim 19 above**, Arpaia et al. clearly disclose the claimed invention except that the local oscillator frequency is derived from a VCO frequency outside a bandwidth of received signal harmonics, the VCO frequency provided by dividing the VCO output by a frequency divide ratio that corresponds to the harmonic of the received signal..

Atkinson clearly shows and discloses a method in intermediate frequency and direct conversion receivers comprising, among other steps, the step of providing a local oscillator signal 24 (mixer injection frequency) (figure 2) by dividing a voltage controlled oscillator (VCO) 38 output by a frequency divide ratio (figure 2 and page 2 paragraphs 0018 and 0019), the VCO 38 having a frequency  $F_3$  outside a bandwidth of received signal harmonics (figure 2 and page 2

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paragraph 0020), and the local oscillator frequency derived from a VCO frequency that is outside a bandwidth of the nth harmonic of the received signal (page 2 paragraphs 0019 and 0020).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the teachings Arpaia et al. with the teachings of Atkinson to specifically select a frequency divide ratio greater or equal to one that would have maintained the local oscillator frequency outside the bandwidth of harmonics or fundamental frequency of the received signal in order to prevent leakage of the local oscillator frequency.

***Allowable Subject Matter***

11. **Claims 1-10** are allowed.
12. **Claims 12** is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including any corrections to the objections made above as well as all of the limitations of the base claim and any intervening claims.
13. The following is an Examiner's statement of reasons for allowance:

Consider **claims 1, 5, and 12**, the best prior art found during the examination of the present application, **Atkinson (U.S. Patent Application Publication # 2001/0039182 A1)** and **Arpaia et al. (U.S. Patent # 6,192,225 B1)**, fails to disclose, teach, or suggest using a mixer

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injection frequency proportional to a first quantity divided by a second quantity, the first quantity proportional to a difference between the received signal frequency and an intermediate frequency, the second quantity proportional to a difference between unity and a quantity proportional to a reciprocal of a chopper divide ratio.

Any comments considered necessary by Applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance".

### ***Conclusion***

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Lindqvist et al. (U.S. Patent # 5,530,929) disclose a homodyne receiver minimizing oscillator leakage;

Shinohara (U.S. Patent # 6,073,000) discloses a direct conversion receiving circuit and direct conversion receiver;

Baltus (U.S. Patent # 6,282,413 B1) discloses multistaged frequency conversion with single local oscillator;

Rozenblit et al. (U.S. Patent # 6,360,087 B1) disclose a direct conversion receiver.

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15. Any response to this Office Action should be **faxed to (703) 872-9314 or mailed to:**

Commissioner of Patents and Trademarks

Washington, D.C. 20231

**Hand-delivered responses** should be brought to

Crystal Park II  
2021 Crystal Drive  
Arlington, VA 22202  
Sixth Floor (Receptionist)

16. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Rafael Perez-Gutierrez whose telephone number is (703) 308-8996. The Examiner can normally be reached on Monday-Thursday from 6:30am to 5:00pm.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, William G. Trost IV can be reached on (703) 308-5318. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9314.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4700 or call customer service at (703) 306-0377.

  
Rafael Perez-Gutierrez  
R.P.G./rpg **RAFAEL PEREZ-GUTIERREZ**  
**PATENT EXAMINER**

  
**WILLIAM TROST**  
**SUPERVISORY PATENT EXAMINER**  
**TECHNOLOGY CENTER 2600**

March 9, 2003